



Systematic Review of the Genus *Yponomeuta* Latreille (Lepidoptera: Yponomeutidae) in Korea

Bong-Kyu BYUN and Yang-Seop BAE^{1)*}

Korea National Arboretum, Pocheon, Prov. Gyeonggi, 487-821 Korea

¹⁾Department of Biology, University of Incheon, Incheon, 402-749 Korea.

E-mail: baes@incheon.ac.kr

Abstract Twelve species of the genus *Yponomeuta* Latreille belonging to the family Yponomeutidae in Korea are recognized. Among them, four species, *Yponomeuta kanaiellus* Matsumura, *Y. montanatus* Moriuti, *Y. sociatus* Moriuti, and *Y. yanagawanus* Matsumura, are reported for the first time from Korea. Adults and genitalia of newly recorded species are illustrated. General biology with host plant records is reviewed for each species. A key to all known species in Korea, based on the external characters, is provided.

Key words Taxonomy, key, new record, *kanaiellus*, *montanatus*, *sociatus*, *yanagawanus*

INTRODUCTION

Genus *Yponomeuta* Latreille, belonging to the subfamily Yponomeutinae, comprises more than 80 species all over the world, and mainly distributed in the Palaearctic region. The species have usually uniform maculations and coloration in the forewing. In Microlepidoptera of Korea, Park (1983) recorded eight species of the genus *Yponomeuta*: *Y. evonymellus* (Linnaeus), *Y. griseatus* Moriuti, *Y. malinellus* Zeller, *Y. polystictus* (Butler), *Y. polystigmellus* C. et R. Felder, *Y. solitariellus* Moriuti, *Y. tokyonellus* Matsumura, and *Y. vigintipunctatus* (Retzius). Among them, four species, *Y. vigintipunctatus* (Retzius), *Y. solitariellus* Moriuti, *Y. tokyonellus* Matsumura, and *Y. griseatus* Moriuti were newly added by him. Since then, no comprehensive study on Korean genus has been conducted to date.

This study was carried out to revise the species of genus *Yponomeuta* Latreille in Korea. Based on our study, in total, twelve species are recognized from Korea, of which four species, *Yponomeuta kanaiellus* Matsumura, *Y. montanatus* Moriuti, *Y. sociatus* Moriuti, and *Y. yanagawanus* Matsumura are recorded for the first time from Korea. All available biological informations for the species are reviewed and enumerated. Adults and genitalic characteristics for the newly recorded species are illustrated and briefly redescribed. A key to all known species of the genus, based on the external characters, is provided.

All the examined specimens are preserved in the collection of the Center for Insect Systematics, Kangweon National University (CIS), Chuncheon, Korea National Arboretum (KNA), Pocheon, Department of Biology, University of Incheon (UIB), Incheon, and National Institute of Agricultural Science and Technology (NIAS), Suwon. The abbreviations used here are as follows: GG: Prov. Gyeonggi, Seoul, and Incheon, GW: Prov. Kangweon, CB: Prov. Chungcheongbuk, CN: Prov. Chungcheongnam, JB: Prov. Jeonlabuk, GN: Prov.

* To whom correspondence should be addressed.

Gyeongsangnam, JJ: Prov. Jeju, PN: Prov. Pyeongannam, S: South Korea, J: Jeju Island, N: North Korea.

SYSTEMATIC ACCOUNT

Yponomeuta Latreille, 1796

Yponomeuta Latreille, 1796: 146. Type species: *Phalaena evonymella* Linnaeus, 1758, by subsequent monotypy.

Coenyphantes Hübner, 1822: 59, 60, 65, 67–80. Type species: *Phalaena evonymella* Linnaeus, 1758, by subsequent designation by Bradley, 1966: 219.

Erminea Haworth, 1811: 512. Type species: *Phalaena evonymella* Linnaeus, 1758, by subsequent designation by Stephens, 1834: 244.

Hyphantes Hübner, 1806: 2. (non descr., nom. nud.)

Hyponomeuta Sodoffsky, 1837: 94. (emendation for *Yponomeuta*)

Nygma Hübner, 1825: 412. Type species: *Phalaena evonymella* Linnaeus, 1758, by subsequent designation by Fletcher, 1928: 8.

The genus *Yponomeuta* can be separated from the related genera of the subfamily Yponomeutinae by the combination of the following characteristics: Forewing white to grey, with black dots on vein; hindwing R₁ anastomosing with Sc beyond middle, parting vein well preserved, distinct hyaline space between cell at base; gnathos with ventral plate being produced into a pair of large spinulose processes; cornuti of aedeagus composed of four distinct spinules (Moriuti, 1982).

Larvae of the genus usually feed on leaves of host plants, in a slight or dense webs on buds, leaves, or twigs. In some species, larvae live in a common web on leaves forming a group. Pupation usually takes place on the host plant or around it, and the pupae are enclosed in a silk cocoon. From the economic point of view, the genus include several serious insect pests of the cultivated plants in Japan (Moriuti, 1977). As it is generally known, *Yponomeuta malinellus* Zeller is a notorious pest of apple trees. In some species, the resting posture of adults is very characteristic as the adults sit closely appressed to the substance, but antennae are laid alongside of the body (Stainton, 1854; Meyrick, 1928; Friese, 1960).

Key to the Korean species of *Yponomeuta* Latreille, based on external characters

1. Forewing white 2
 - Forewing not white 8
2. Forewing with about 25 or less black dots *kanaiellus* Matsumura
 - Forewing with about 35 or more black dots 3
3. Forewing with supramedian series of black dots 4
 - Forewing without supramedian series of black dots *malinellus* Zeller
4. Cilia of hindwing entirely white; in some specimens dorsal cilia lightly tinged with pale grey basally *tokyonellus* Matsumura
 - Cilia of hindwing not entirely white; dorsal cilia grey or pale grey 5
5. Forewing rather narrow, the length 3.3 times of width; dorsal cilia pale grey *evonymellus* (Linnaeus)
 - Forewing moderate, the length 3 times of width; dorsal cilia white 6
6. Wingspan 25 mm (rarely 24 mm) or more *polystictus* (Butler)
 - Wingspan 22 mm (rarely 23 mm) or less 7
7. Forewing with 8–10 black dots between supramedian and submedian series towards termen *sociatus* Moriuti

- Forewing with 3–5 black dots in such space *polystigmellus* C. et R. Felder
- 8. Both head and thorax white *kanaellus* Matsumura, in part
- Head white to grey; thorax greyish white to grey 9
- 9. Terminal cilia of forewing with a blackish bar or line on upper half 10
- Terminal cilia of forewing without a blackish bar or line on upper half
..... *montanatus* Moriuti
- 10. Cilia of forewing with a whitish spot on costa before apex *solitariellus* Moriuti
- Cilia of forewing without a whitish spot on costa before apex 11
- 11. Forewing without supramedian series of black dots *vigintipunctatus* (Retzius)
- Forewing with supramedian series of black dots 12
- 12. Forewing with 4 or 5 black dots in a series beneath supramedian series, from 1/4 to middle
..... *griseatus* Moriuti
- Forewing without 4 or 5 black dots in a series beneath supramedian series, from 1/4 to
middle *yanagawanus* Matsumura

***Yponomeuta evonymellus* (Linnaeus, 1758) 뽕나무집나방 (뽕나무좀나방)**

Phalaena evonymella Linnaeus, 1758, Syst. Nat. (ed. 10): 534. Type locality: Europe.

Hyponomeuta padi Zeller, 1844, Isis, Leipzig, 1844: 225, pl. 1: 20–23, 28, 29.

Hyponomeuta refrigerata Meyrick, 1931, Exot. Microl. 4: 172; Issiki, 1932: 1488; Inoue, 1954: 37.

Yponomeuta evonymella: Latreille, 1802: 417; For. Res. Ins. 1969: 75; Kor. Soc. Pl. Prot. 1972: 131.

Yponomeuta evonymellus: Rebel, 1901, Cat. Lep. Pal. Faun. 2: 132; Moriuti, 1977: 153, figs. 48, 137, 155, 192, 212, 264, 282, 290, 415, 517, 557, 561; Moriuti, 1982, 1: 215, 2: 196, pl. 8: 53; Park, 1983: 535, 929, fig. 192; Liu, 1983: 17; Park, 1994, In Shin & Yoon, Check List Ins. Kor.: 325.

Wingspan 19–23 mm. Forewing white in colour, dispersed with about 48–65 small black spots. Cilia rather white, pale grey on dorsum but rarely white. Hindwing and cilia grey.

Material examined. [KNA] GW– 1 ♀, Chuncheon, 5 VIII 1996 (WK Kim); 1 ♂, Chuncheon, 11 VI 1995 (BK Byun); 1 ♀, Mt. Odaesan, 26 VI 1989 (BK Byun). [NIAS] GG– 2 exs, Suigen, ? VIII 1928 (S Muramatsu); 1 ex, Suigen, 8 VIII 1929 (S Muramatsu); 5 exs, Suigen (=Suweon), 20 VI 1928 (S Muramatsu); 2 exs, Suigen, 13 VI 1928 (S Muramatsu). GW– 1 ♂, Chuncheon, 5 VIII 1998 (WK Kim).

Distribution. Korea (S), Japan, China (Northeast), Russia (Sahalin, E. Siberia), and Europe.

Host plants. *Prunus padus* L., *P. domestica* L., and *P. cerasus* L. (Rosaceae) (Park, 1983). *Prunus padus* L., *P. ssiori* Fr. S. in Japan; *P. padus* in Europe; *P. domestica* L., *P. cerasus* L., *Sorbus aucuparia* L. (Rosaceae) (Moriuti, 1977).

Remarks. The species has one generation a year. Adults fly during mid July. Larvae are found from June to early July and overwinter as a first instar. Larvae dwell in a web spun on leaves, forming a group. Mature larvae pupate within a white cocoon (Park, 1983).

***Yponomeuta griseatus* Moriuti, 1977 잔먹점집나방 (그리시아집나방)**

Yponomeuta griseatus Moriuti, 1977, Fauna Japonica Yponom.: 196, figs. 65, 278, 304, 429. Type locality: Ryukyu Is., Japan; Moriuti, 1982, 1: 218, 2: 196, pl. 9: 12; Park, 1983: 536, 930, pl. 35: 614, fig. 193; Park, 1983, Ins. Koreana, 3: 69; Park, 1994: 325.

Wingspan 7–19 mm. Forewing light grey, with 41–52 small black spots. Hindwing grey, rather paler basally; cilia grey somewhat paler beyond half.

Material examined. [KNA] GG– 1 ♂, Osan, 22 IV 1998 (BK Kim). JJ– 5 ♂ 3 ♀, Bijarim, Jeju, 23 IV 1999 (BK Byun); 1 ♀, Bijarim, Jeju, 22 IV 1999 (BK Byun). CB 1 ♂, Cheongju, 22 IV 1998 (JS Chae). [NIAS] JJ– 2 ♂ 2 ♀, Jeju, 23 IV 1999 (BK Byun).

Distribution. Korea (S, J) and Japan.

Remarks. This species can be distinguished from the allies by the conspicuous plicated stigma on the forewing. The species is probably univoltine in Korea.

***Yponomeuta kanaellus* Matsumura, 1931 어리검은줄집나방 (신칭) (Figs. 1, 5, 8)**

Ypsolopha kanaellus Matsumura, 1931, 6000, Ill. Ins. Japan: 1097, no. 2270. Type locality: Japan.

Yponomeuta kanaellus: Inoue, 1954: 38, no. 169; Moriuti, 1977: 179, figs. 57, 271, 289, 297, 422, 524, 558, 568; Moriuti, 1982, 1: 217, 2: 196, pl. 9: 5.

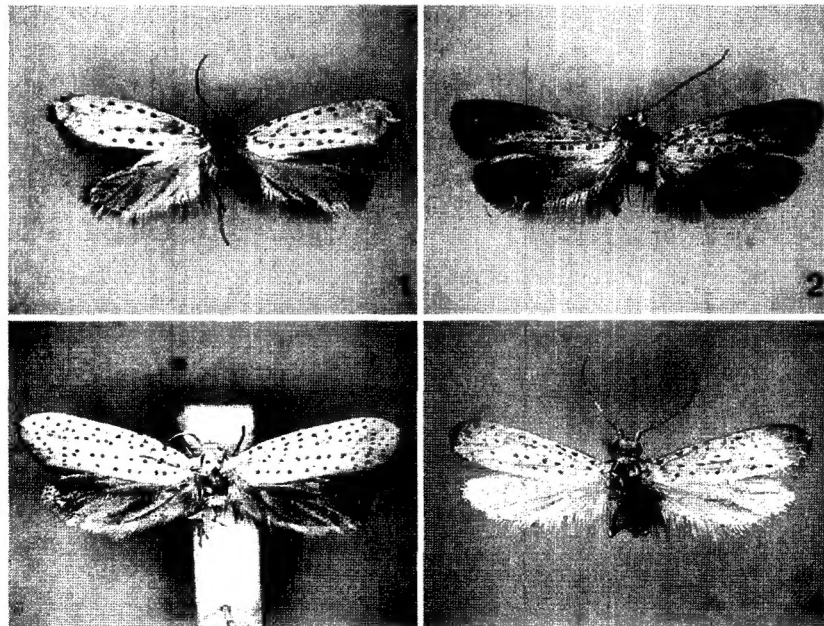
Wingspan 14–19 mm. Forewing white with about 19–25 large or moderate black dots on basal 4/5. Hindwing grey, somewhat paler towards base; cilia paler than wing, outer half pale grey.

Male genitalia (Fig. 5). Socius broad with one or two thorns at apex. Ventral plate of gnathos produced into spatulate process. Valva semicircular, the ventral margin being evenly arched, and the dorsal margin being weakly sinuate before distal end; sacculus defined, very narrow, gradually dilated distally, with a pointed apex, and set with slender hairs. Saccus stout, a little dilated anteriorly. Aedeagus much longer than valva.

Female genitalia (Fig. 8). 8th to 10th segment long; pads of lamella postvaginalis thin, rounded. Antrum large; corpus bursae large.

Material examined. [CIS] GW– 1 ♂, Sogeumgang, 7 VII 1988 (KT Park); 1 ♂, Hongcheon Exp. For., 10 VI 1988 (KT Park); 1 ♂, Chuncheon, 13 V 1987 (KT Park); 1 ♀, Chuncheon, 13 VI 1985 (KT Park). GG– 2 ♀, Gwangleung, 27 VI 1986 (KT Park & MK Ko). [KNA] GG– 1 ♀, Hongleung, 20 VI 1996 (BK Byun); 1 ♀, Is. Baekryeongdo, 15 VI 1988 (BK Byun). [NIAS] GG– 1 ♀, Is. Baekryeongdo, 15 VI 1998 (BK Byun); 1 ♀, Suweon, 4 VI 1988 (SB Ahn). GW– 1 ♂, Pyeongchang, 24 VI 1988 (SB Ahn).

Distribution. Korea (new record) and Japan.



Figs. 1–4. Adults: 1. *Yponomeuta kanaellus* Matsumura; 2. *Y. montanatus* Moriuti; 3. *Y. sociatus* Moriuti; 4. *Y. yanagawanus* Matsumura.

Host plant. *Eunonymus alatus* (Thunberg) (Celastraceae) (Moriuti, 1977). *Eunonymus alatus* is a newly recorded host plant through this study.

***Yponomeuta malinellus* Zeller, 1838 사과집나방**

Yponomeuta malinellus Zeller, 1838, Isis von. Oken, 1838: 670; Moriuti 1977: 156, figs. 49, 265, 283, 291, 307–311, 319, 416, 518, 562; Moriuti, 1982, 1: 215, 2: 196, pl. 8: 54; Park, 1983: 534, 929, pl. 35: 611, fig. 191; Park, 1983, Ins. Koreana, 3: 68; Liu, 1983: 17; Park, 1994: 325.

Yponomeuta padella var. *malivorella* Guenée, 1845, Ann. Soc. Ent. France, (2)3: 342.

Yponomeuta malinella: For. Res. Ins. 1969: 75; Kor. Soc. Pl. Prot. 1972: 131.

Hyponomeuta padellus sensu Issiki, 1968, In Esaki et al., Icon. Het. Jap. Coll. nat. (edn. 1., amended), 1: 23, pl. 3: 82.

Wingspan 21–24 mm. Forewing white, with 35–45 small black spots forming four rows, rather smaller than *Y. evonymellus* (Linnaeus).

Material examined. [KNA] GW– 1 ♂, Chuncheon, 29 V 1989 (BK Byun). [NIAST] GG– 1 ex, Mt. Cheonggyesan, 12 VIII 1976 (KT Park); 2 exs, Gwangleung, 9 VI 1977 (KT Park); 1 ♀, Suigen (= Suweon), 20 VI 1928 (S Muramatsu). GW– 8 exs, Mt. Seoraksan, 13 VI 1973 (KY Choi); 3 exs, Hongcheon, 12 VI 1973 (YI Lee); 1 ex, Hongcheon, ?, VI 1973; 1 ex, Hongcheon, 12 VI 1973 (KY Choi); 1 ex, Mt. Seoraksan, 13 VI 1973 (YI Lee); 2 exs, Hongcheon, 12 VI 1973 (YI Lee). CN– 1 ex, Mt. Gyeryongsan, 20 VI 1980 (KT Park). JB– 1 ex, Muju, 12 VIII 1975 (KT Park).

Distribution. Korea (S, N), Japan, China (Northeast), Russia (Saghalien), Asia Minor, Azerbaijan, Europe, and N. America.

Host plants. *Malus pumila* M. and *M. sieboldii* R. (Rosaceae) (Park, 1983).

Biology. The species is univoltine and overwinters as first instar larva. Adults can be observed from mid June to late July. It is well known as a notorious insect pest of apple trees (Park, 1983).

Remarks. This species is similar to *Y. evonymellus* (Linnaeus), but it can be distinguished from the latter by the followings: in male genitalia, socii rather strongly curved, valva proportionally broader, and saccus stouter than that of the latter, in female genitalia, the gap between papilla analis rather smaller, and ventral arm of apophysis anterioris narrower than that the latter.

***Yponomeuta montanatus* Moriuti, 1977 검은줄집나방 (신칭) (Figs. 2, 9)**

Ypsolopha vitellus Moriuti, 1977, Faun. Japon. Yponom.: 190, figs. 62, 426. Type locality: Nagano, Japan; Moriuti, 1982, 1: 216, 2: 196, pl. 233: 12.

Wingspan 22–24 mm. Forewing grey; costa with black dots at base with about 50 moderate black dots on the forewing. Hindwing and cilia grey, gradually darker towards apex.

Female genitalia (Fig. 9). Antrum narrow, slightly tapering anteriorly, and much longer than that of *Y. anatolicus*; ductus bursae proportionally longer than in *Y. anatolicus*; corpus bursae a little longer than that of *Y. anatolicus*.

Material examined. [UIB] GG– 4 ♂, Mt. Gwangdeoksan, 20 VII 1996 (Bae, Paek, Lee, Ahn Jeon); 1 ♀, ditto, 20 VII 1996 (Bae, Paek, Lee, Ahn & Jeon); 2 ♂ 1 ♀, Mt. Cheonmasan, 13 VII 1996 (YS Bae); GW– 1 ♀, Mt. Gyebangsan, 15 VII 1996 (Paek, Lee & Ahn). GB– 1 ♀, Mt. Tonggosan, 26–31 VI 2000 (YS Bae et al.). GW– 6 ♀, Unduryeong, Mt. Gyebangsan, 13 VIII 1995 [KNA] GG– 1 ♂ 2 ♀, Gwan (BK Byun); 1 ex, Mt. Yaksusan, 8 VIII 1989 (BK Byun). [CIS] GG– 1 ex, Gwangleung, 8 VII 1992 (KT Park & BK Byun). [NIAST] GG– 1 ex, Gwangleung, 17 VI 1994 (BK Byun & HP Jeong); 1 ♀, Mt. Gwangdeoksan, 23 VI 1994 (BK Byun).

Distribution. Korea (new record) and Japan.

Host plant. *Eunymus oxyphyllus* M. (Celastraceae) (Moriuti, 1977).

Remarks. This species is very similar to *Y. meguronis*, but it can be distinguished by a little larger size and much larger black dots of forewing than those of the former species, *Y. malinellus* Zeller.

***Yponomeuta polystigmellus* C. et R. Felder, 1862 귀룽나무집나방**

Yponomeuta polystigmellus C. et R. Felder, 1862, Wiener Ent. Monat. 6: 40. Type locality: ?Ning-Po.

Yponomeuta polystigmellus: Moriuti, 1977: 177, figs. 55, 56, 270, 288, 296, 421, 523, 559, 567; Moriuti, 1982, 1: 216, 2: 196, pl. 9: 4; Park, 1983: 534, 928, fig. 190; Park, 1983, Ins. Koreana, 3: 68; Liu, 1983: 17; Park, 1994: 325.

Wingspan 16–21 mm. Forewing white, with 40–50 small black spots. Hindwing grey, rather darker posteriorly.

Material examined. [KNA] 2 ♂ 4 ♀, Hongcheon, 20 VII 2000 (BK Byun & WI Bae). [CIS] GW– 1 ♂, Mt. Odaesan, 26 VI 1989 (KT Park); 3 ♂, Chuncheon, 11 VI 1989 (KT Park & BK Byun); 1 ♂, Chuncheon, 28 V 1989 (KT Park & BK Byun). [NIAST] GG– 1 ex, Suigen, 20 VI 1928 (S Muramatsu); 1 ex, Suweon, 1 VII 1968 (KT Park); 1 ex, Gwangleung, 9 VI 1977 (KT Park). GW– 1 ex, Daegwanryeong, 14 VI 1973 (YI Lee).

Distribution. Korea (S), Japan, and China.

Host plant. *Euonymus alatus* T. (Celastraceae) (Park, 1983).

Remarks. In male genitalia, this species is similar to *Y. polystictus* and *Y. sociatus*, but smaller in size and differing in the shape of valva and in sacculus with a small vestigial thorn-like sclerotization in distal portion, which is absent in the others.

***Yponomeuta polystictus* (Butler, 1879) 화살나무집나방**

Yponomeuta polysticta Butler, 1879, Ill. Het. Coll. Br. Mus. 3: 81, pl. 60: 11. Type locality: Japan.

Yponomeuta tryodes Meyrick, 1913, Exot. Microl. 1: 138.

Yponomeuta polystictus: Moriuti, 1977: 170, figs. 53, 123, 124, 268, 294, 419, 521, 556, 565; Moriuti, 1982, 1: 216, 2: 196, pl. 9: 2; Park, 1983: 533, 928, pl. 35: 609, fig. 189; Park, 1983, Ins. Koreana, 3: 68; Park, 1994: 325.

Yponomeuta polysticta: For. Res. Ins., 1969, List For. Ins. Pests Korea: 76; Kor. Soc. Pl. Prot. 1972: 131.

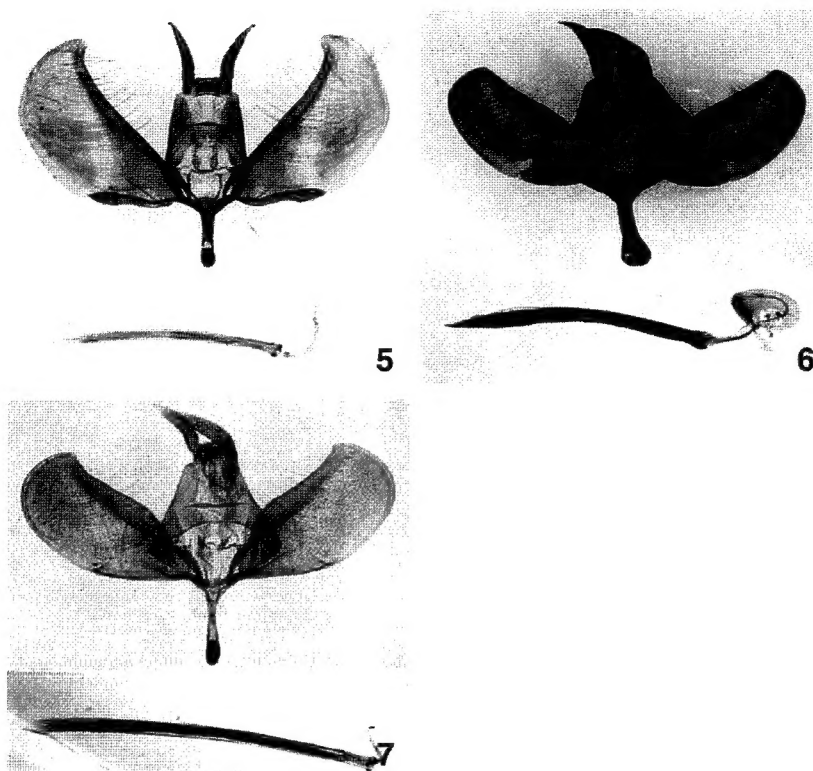
Wingspan 24–31 mm. Forewing white, costal edge extremely blackish-grey on base to 2/5 with about 45–70 small black spots. Hindwing grey, around apex and along termen white or whitish on outer half or except at base.

Material examined. [UIB] GW– 1 ♂, Mt. Taebaeksan, 26–27 VI 1996 (Bae, Paek, Lee & YS Bae & NH Ahn). GG– 1 ♂ 3 ♀, Mt. Gwangdeoksan, 20 VII 1996 (Bae, Paek, Lee, Ahn & Jeon); 2 ♂ 2 ♀, Is. Deokjeokdo, 24 VI 1997 (YS Bae & NH Ahn). JJ– 1 ♀, Mt. Hanra, 12 VIII 1997 (BW Lee & NH Ahn). CB– 1 ♀, Reser. Seonjeon, Taeon-up, 16 VII 1996 (MK Paek). [KNA] GG– 1 ♂ 1 ♀, Is. Baekryeongdo, 15 VI 1998 (BK Byun). JJ– 1 ♀, Gwaneum-sa, Jeju, 13 VIII 1993 (BK Byun & HP Jeong). [NIAST] GG– 1 ♀, Is. Baekryeongdo, 15 VI 1998 (BK Byun). GN– 1 ♂ 2 ♀, Mt. Waryongsan, Sachon, 5 VII 1999 (GH Lee). GW– 1 ♂, Pyeongchang, 24 VI 1988 (SH Oh).

Distribution. Korea (S, J), Japan, and China.

Host plants. *Euonymus sieboldianus* B. and *E. oxyphyllus* M. (Celastraceae) (Park, 1983).

Biology. The species is univoltine and overwinters as first instar larva. Adults can be found from June to July. Larvae live in a web on *Euonymus sieboldianus* B. and *E. oxyphyllus* M., forming a group, which often infest the entire host tree. Pupation takes place in a center of webbing site (Park, 1983).



Figs. 5–7. Male genitalia: 5. *Yponomeuta kanaellus* Matsumura; 6. *Y. sociatus* Moriuti; 7. *Y. yanagawanus* Matsumura.

***Yponomeuta sociatus* Moriuti, 1972 흰점무늬집나방 (신칭) (Figs. 3, 6, 10)**

Yponomeuta sociatus Moriuti, 1972, Kontyû, 40: 253, f. 5, 16, 20, 25, 29, 33. Type locality: Japan, Hirosaki; Moriuti, 1977: 175, figs. 54, 269, 287, 295, 420, 522, 566; Moriuti, 1982, 1: 216, 2: 196, pl. 9: 3.

Wingspan 17–23 mm. Head, antenna and palpus white. Thorax white, with black dots. Forewing white, extreme costal edge black–grey on basal 1/5; about 50–70 small or moderate black dots.

Male genitalia (Fig. 6). Very similar to those of *Y. polystictus*, but can be discern in the characteristics of sacculus. Valva proportionally broader than *Y. polystictus*; sacculus narrower than *Y. polystictus* in form.

Female genitalia (Fig. 10). It is similar to those of *Y. polystictus*, but can be distinguished from the former by smaller in size, and differ in relatively smaller caudal pads of lamella postvaginalis.

Material examined. [UIB] GG– 1 ♂ 3 ♀, Mt. Godaesan, 12 VII 2001 (Kim, Kim, Oh & Choi); 2 ♀, *ditto*, 11 VII 2000 (Paek, Kim, Kim & Ko); 1 ♀, Is. Yeongheungdo, 16 VII 1999 (Kim, Kim, Oh & Lee); 1 ♂, Mt. Myeongseongsan, 20 VII 1999 (Paek, Lee & Oh); 1 ♂, Mt. Yongmunsan, 28 VII 2000 (CM Lee & YK Kim); 1 ♂ 1 ♀, Mt. Hwaaksan, 26 VII 1999 (Lee, Kim & Kim); 1 ♂, Mt. Gunjasan, 10 VII 2000 (Paek, Kim, Kim & Ko); 1 ♀, Is. Deokjeokdo, 24 VI 1997 (YS Bae & NH Ahn); 1 ♂, Is. Muyido, 9 VII 2002 (Kim, Lee, Song & Kim).

GW- 2 ♀, Jindonggyegok valley, 1 VIII 2002 (Paek, Lee & Song); 5 ♂ 3 ♀, Mt. Bangtaesan, 3 VII 2002 (Bae, Oh, Choi & Song); 1 ♀, Mt. Osaeksan, 4 VII 2002 (Kim, Lee, Yu & Kim); 1 ♂ 1 ♀, Mt. Gyeongbongsan, 7 VIII 1997 (YS Bae & NH Ahn); 1 ♂ 4 ♀, *ditto*, 19 VII 2000 (Bae, Lee & Lee); 2 ♂ 2 ♀, Mt. Daewusan, 17 VII 2000 (Paek, Kim & Yu); 2 ♂, Mt. Bokjusan, 13 VII 2000 (Paek, Kim, Kim & Ko); 1 ♂ 1 ♀, Mt. Seokbyeongsan, 3 VII 2002 (Kim, Lee, Yu & Kim); 1 ♂, Mt. Seoraksan, 4 VII 2002 (Bae, Oh, Choi & Song); 1 ♂ 2 ♀, Mt. Baekseoksan, 18 VII 2000 (Paek, Kim & Yu); 1 ♀, Mt. Jeombongsan, 11 VII 1997 (Paek, Lee, Jang, Choi & Kim); 1 ♂, Mt. Chiaksan, 12 VII 1997 (YS Bae & NH Ahn); 1 ♂ 2 ♀, Mt. Odaesan, 22 VII 2000 (Bae, Lee & Lee); 1 ♀, Bongmyeong-ri, 25 VII 1999 (Bae et al.); 1 ♂, Jogyeong-dong, 31 VII 2002 (Paek, Lee & Song); 1 ♂, Mt. Bokjusan, 13 VII 2000 (Paek, Kim, Kim & Ko); 1 ♀, Mt. Jijangsan, 25 VII 2002 (Bae, Paek, Oh & Kim). CN- 2 ♂, Mt. Daedunsan, 13 VII 2000 (Lee, Yu, Kim & Paek); 2 ♀, Mt. Weolmyeongsan, 13 VII 2000 (Kim, Lee & Oh); 1 ♂ 1 ♀, Mt. Gyeryongsan, 11 VII 2000 (Kim, Lee & Oh); 1 ♂, Mt. Chilgabsan, 12 VII 2000 (Kim, Lee & Oh). GB- 3 ♂ 2 ♀, Mt. Baekamsan, 15 VII 1999 (Lee, Kim & Kim); 1 ♂ 2 ♀, Mt. Tonggosan, 26-31 VI 2000 (YS Bae et al.); 1 ♀, Mt. Juwangsan, 16 VII 1999 (Lee, Kim & Kim); 1 ♂, Mt. Jirisan, 25-28 VI 2001 (YS Bae et al.). GN- 1 ♀, *ditto*, 25-28 VI 2001 (YS Bae et al.); JN- 1 ♀, Mt. Mudeungsan, 11 VII 2000 (Lee, Yu, Kim & Paek). [KNA] GG- 2 ♂ 1 ♀, Gwangleung, 10 VI 1998 (BK Byun); 1 ♀, Gwangleung, 13 VII 1998 (BK Byun); 3 ♀, Gwangleung, 17 VI 1994 (BK Byun); 2 ♀, Gwangleung, 13 VII 1999 (JC Sohn); 1 ♀, Gwangleung, 11 VI 1999 (BK Byun); 1 ♀, Gwangleung, 25 VI 1999 (TS Kwon & BK Byun); 1 ♀, Gwangleung, 27 VII 1998 (BK Byun). [CIS] GG- 1 ♂, Gwangleung, 10 VII 1990 (KT Park). GW- 2 ♀, Bongmyongri, 30 VI 1992 (KT Park & BK Byun); 1 ♀, Bongmyongri, 23 VII 1992 (KT Park & BK Byun); 1 ♀, Chuncheon, 26 VI 1984 (KT Park). GG- 1 ♀, Suweon, 20 VII 1976 (KT Park). [NIAS] GG- 2 ♀, Gwangleung, 13 VII 1998 (BK Byun); 1 ♀, Gwangleung, 13 VII 1998 (BK Byun).

Distribution. Korea (new record) and Japan.

Host plant. *Celastrus orbiculatus* T. (Celastraceae) (Moriuti, 1977).

Biology. General biology of the species is little known in this country. According to Moriuti (1977), it is probably a univoltine species and larvae can be reared with *Celastrus orbiculatus* T. in mid-June.

Yponomeuta solitariellus Moriuti, 1977 참회나무집나방

Yponomeuta solitariellus Moriuti, 1977, Fauna Japonica Yponom.: 183, figs. 59, 273, 299, 423, 526. Type locality: Mt. Kozindake, Wakayama Pref., Japan; Moriuti, 1982, 1: 217, 2: 196, pl. 9: 7; Park, 1983: 533, 928, pl. 35: 608; Park, 1983, Ins. Koreana, 3: 68; Park, 1994: 325.

Wingspan 19-26 mm. Forewing grey, with slightly paler area on about basal half along fold with 50-70 small black dots. Hindwing grey, paler towards base; outer half of the latter pale grey.

Material examined. [UIB] GW- 4 ♂ 1 ♀, Mt. Taebaeksan, 26-27 VI 1996 (Bae, Paek, Lee & Ahn); 1 ♀, Mt. Gyeongbongsan, 15 VIII 1996 (Paek, Lee & Ahn); 1 ♀, *ditto*, 15 VII 1996 (Paek, Lee & Ahn); 1 ♀, Unduryeong, 20 VII 2000 (Bae, Lee & Lee). [CIS] GG- 2 ♀, Gwangleung, 27 VI 1986 (KT Park & MK Ko). GW- 1 ♀, Mt. Odaesan, 12 IX 1976 (KB Uhm). [KNA] GG- 3 ♀, Gwangleung, 10 IX 1998 (BK Byun); 1 ♂ 2 ♀, Gwangleung, 27 VII 1998 (BK Byun); 1 ♂ 2 ♀, Gwangleung, 27 VII 1998 (BK Byun). GW- 1 ♂, Gwangdeok, 23 VI 1994 (BK Byun); 1 ♀, Unduryeong, Mt. Gyeongbongsan, 13 VIII 1995 (BK Byun). [NIAS] GG- 1 ♀, Gwangleung, 17 VI 1994 (BK Byun & HP Jeong); 1 ♂, Gwangleung, 10 IX 1998 (BK Byun).

Distribution. Korea (S), Japan, and N. China.

Host plant. *Euonymus oxyphyllus* M. (Celastraceae) (Park, 1983).

Biology. The species have univoltine in Japan. Larvae feed on *Euonymus oxyphyllus* M. from April to late May. Pupation takes place in a web after making white dense cocoon for 10 days. Adults emerge on late May and overwinter as adult (Moriuti, 1977; Park, 1983).

***Yponomeuta tokyonellus* Matsumura, 1931 참빗살집나방**

Yponomeuta tokyonellus Matsumura, 1931, 6000 Ill. Ins. Japan, : 1098. Type locality: Tokyo, Japan.

Yponomeuta minuellus Walker, 1863, Cat. Lep. Het. Brit. Mus. 28: 533.

Yponomeuta tokyonellus: Moriuti, 1977, : 166, figs. 52, 267, 285, 293, 418, 520, 555, 564; Moriuti, 1982, 1: 216, 2: 196, pl. 9: 1; Park, 1983: 536, 929; Park, 1983, Ins. Koreana, 3: 69; Park, 1994: 325.

Wingspan 24–29 mm. The species is the largest in size among the genus. Forewing white, extreme costal edge blackish-grey on basal 1/5 with about 60–80 small black spots in the 7 longitudinal rows.

Material examined. [UIB] GW– 1 ♀, Mt. Chiaksan, 16 VII 1998 (Bae, Ahn & Kim); 1 ♀, Mt. Balgyosan, 7 VII 1998 (Paek, Lee, Kim & Song). GG– 1 ♀, Is. Deokjeokdo, 24 VI 1997 (YS Bae & NH Ahn). GB– 1 ♀, Mt. Seondalsan, 29 VI 1998 (YS Bae & MK Paek). JN– 1 ♀, Mt. Baegunsan, 19 VII 1998 (Bae, Paek, Lee, Ahn, Kim & Song). [CIS] GG– 1 ♀, Suweon, 30 VI 1963. [KNA] GG– 1 ♂, Gwangleung, 9 VIII 1982 (KJ Won). [NIAS] GG– 1 ex, Suweon, 20 VI 1963; 1 ♀, Mt. Cheonggyesan, 13 VIII 1976 (KT Park).

Distribution. Korea (S), Japan, and China (North, Central).

Host plant. *Euonymus sieboldianus* B. (Celastraceae) (Park, 1983).

Biology. Adults appear from early June and have one generation a year. The species overwinters as first instar larva. They can be often observed in fields, but sometimes in the lower montane region. The larvae live solitarily in a rough web and are matured in it. The matured larva makes a white cocoon and pupates in it. The pupa is yellowish white. Pupal period is 10 days. Newly hatched larva bores into buds and overwinters (Moriuti, 1977; Park, 1983).

***Yponomeuta vigintipunctatus* (Retzius, 1783) 꿩비름집나방**

Phalaena vigintipunctata Retzius, 1783, In de Geer, Genera Spec. Insect.: 52. Type locality: Sapporo, Japan.

Yponomeuta vigintipunctatus: Moriuti, 1977: 198, figs. 67, 280, 306, 431, 530, 574; Moriuti, 1982, 1: 218, 2: 196, pl. 9: 14; Park, 1983: 532, 928, pl. 35: 607, fig. 188; Park, 1983, Ins. Koreana, 3: 68; Park, 1994: 325.

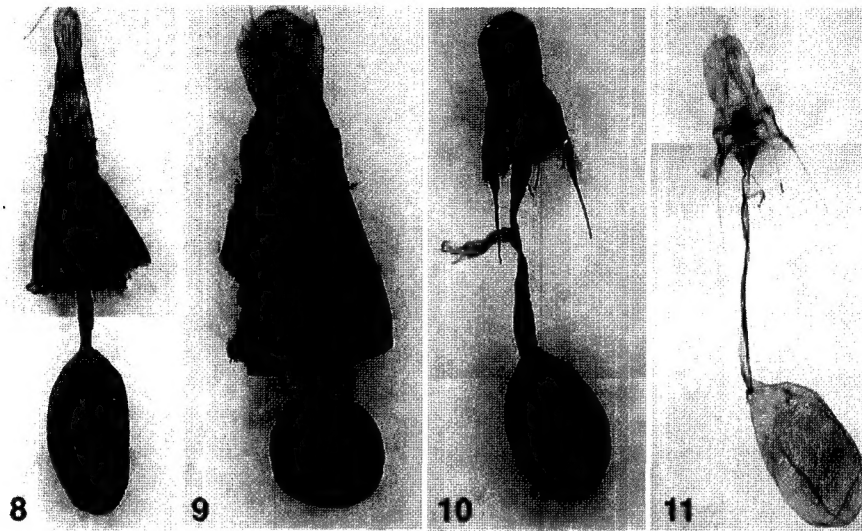
Yponomeuta apicalis Matsumura, 1931, 6000 Ill. Ins. Japan: 1097.

Yponomeuta elementaris Meyrick, 1931, Exot. Microl. 4: 172.

Yponomeuta sedella Treitschke, 1833, Schmett. Eur. 9(1): 223.

Wingspan 14–16 mm. Forewing grey to pale grey with 15–29 small black dots. Hindwing grey or pale grey, somewhat paler towards base; cilia concolorous, on outer half paler.

Material examined. [UIB] GW– 2 ♂ 1 ♀, Jinburyeong, 7 VII 1998 (Bae, Ahn & Kim); 1 ♀, Mt. Gwangdeoksan, 9 VII 1997 (MK Paek); 1 ♂, Mt. Gyeongbongsan, 2 VII 1997 (YS Bae). GG– 1 ♂ 1 ♀, Mt. Cheonggyesan, 13 VII 2001 (Kim, Kim & Oh); 1 ♂, ditto, 10 V 2001 (Bae, Kim, Kim & Oh); 1 ♂ 1 ♀, Is. Deokjeokdo, 8 VI 1997 (YS Bae & NH Ahn). GB– 1 ♂, Mt. Seondalsan, 29 VI 1998 (YS Bae & MK Paek); 2 ♂ 2 ♀, Mt. Gayasan, 15 VI 1997 (Bae, Paek, Lee, Oh & Ahn); 2 ♂, Mt. Ingyeongsan, 8 VI 1997 (Bae, Paek, Lee, Oh & Ahn); 1 ♂ 1 ♀, Mt. Tonggosan, 26–31 VI 2000 (YS Bae et al.). GN– 2 ♂, Mt. Nojasan, 22–26 VI 1998 (YS Bae et al.). JJ– 1 ♀, Temp. Gwaneumsa, 20 VI 1999 (MK Paek). [CIS] GG– 1 ♂, Gwangleung, 7 VIII 1986 (KT Park). GW– 2 ♂, Chugok, Chuncheon, 30 VII 1986 (KT Park). [KNA] GW– 1 ♂, Chuncheon, 2 VII 1989 (BK Byun); 1 ♂, Jiamri, Chuncheon, 17 VII 1995 (HK Lee); 1 ♂, Chuncheon, 6 VII 1992 (BK Byun). JJ– 1 ♀, Temp. Gwaneumsa, Jeju, 24



Figs. 8–11. Female genitalia: 8. *Yponomeuta kanaellus* Matsumura; 9. *Y. montanatus* Moriuti; 10. *Y. sociatus* Moriuti; 11. *Y. yanagawanus* Matsumura.

VIII 1992 (BK Byun). [NIAS] GG– 1 ex, Suweon, 22 VI 1976 (MH Lee); 2 ♂, Gwang-leung, 29 VI 1998 (BK Byun & YS Park). GW– 6 exs, Mt. Chiaksan, 23 VI 1977 (KT Park).

Distribution. Korea (S, J), Japan, N. China, Russia (Ussuri), and Europe.

Host plants. *Sedum spectabile* B. et S. and *S. erytgrostictum* M. (Crassulaceae) in Japan (Moriuti, 1977). *Sedum telephium* L., *S. maximun* L., *S. album* L., *S. purpurescens* K. in Europe (Martouret, 1966). *Euonymus europaeus* L. (Celastraceae) (Werner, 1958). *Sedum spectabile* B. et S. and *S. erytgrostictum* M. (Park, 1983).

Biology. Adults appear from April to September. The species overwinters as pupa and emerges in the next spring. The larvae tie several leaves and live in it. The fully grown larvae of fourth generation drop onto the ground and make a cocoon for overwintering under fallen leaves (Park, 1983).

***Yponomeuta yanagawanus* Matsumura, 1931 끝검은집나방(신칭) (Figs. 4, 7, 11)**

Yponomeuta yanagawanus Matsumura, 1931, 6000 Ill. Ins. Japan: 1098, no. 2276. Type locality: Japan.

Hyponomeuta mochlocrossa Meyrick, 1935, Exot. Microlep. 4: 602.

Yponomeuta yanagawanus: Moriuti, 1977: 197, figs. 66, 279, 305, 430; Moriuti, 1982, 1: 218, 2: 196, pl. 9: 13.

Wingspan 16–17 mm. Forewing pale grey with 37–47 small black dots. Hindwing grey, gradually darker towards apex, cilia grey, on outer half a little paler.

Male genitalia (Fig. 7). Gnathos having broad ventral plate with elongate processes. Saccus parallel-sided. Otherwise similar to *Y. griseatus*.

Female genitalia (Fig. 11). Caudal pads of lamella postvaginalis small, widely remote to each other. Ostium bursae extremely wide; antrum triangulated in ventral aspect; ductus bursae very long.

Material examined. [UIB] GG– 1 ♂, Mt. Surisan, 28 VIII 1997 (Jeon, Lee, Lee & Choi); 1 ♂, Mt. Cheonggyesan, 10 V 2001 (Bae, Kim, Kim & Oh); 1 ♂, Mt. Mireuksan, 4 V 1997

(Lee, Ahn, Oh & Lee). [KNA] GW- 1 ♀, ChuncheonDam, 14 V 1991 (BK Byun). [CIS] GW- 1 ♂, ChuncheonDam, 22 VII 1991 (KT Park); 1 ♂, Chuncheon, 1 V 1989 (KT Park). [NIAS] GG- 1 ♂, Mt. Myeongjisan, 23 V 1991 (BK Byun).

Distribution. Korea (new record) and Japan.

Acknowledgements This research was supported by the National Institute of Agricultural Science and Technology (RDA) awarded to the second author (1998–2000). We are greatly indebted to Prof. K.T. Park of CIS and late Prof. S. Moriuti of Osaka Prefecture University, Japan, for their helpful suggestions and encouragement. Many thanks are owed to Dr. M.K. Paek, Messrs. Y.K. Kim, J.H. Kim, C.M. Lee, and H.G. Oh of UIB, N.H. Ahn and B.W. Lee of Osaka Prefecture University, Japan for their assistance in collecting the material.

REFERENCES

- Butler, A.G. 1879. *Illustration of Typical Specimen of Heterocera in the collection of the British Museum* 3, London.
- Clarke, J.F.G. 1965. *Catalogue of the Type specimens of the Microlepidoptera in the British Museum (Natural History) described by Edwards Meyrick* 5. London.
- Denis, J.N.C.M. and I. Schiffermüller. 1775. *Ankündigung eines systematischen Werkes von den Schmetterlingen der Wienergegend*. Vienna: Bernard. 322, pl. 2.
- For. Res. Ins. 1969. *List For. Ins. Pests & Weeds Korea*, Seoul.
- Friese, G. 1960. Revision der paläarktischen Yponomeutidae unter besonderer Berücksichtigung der Genitalien. *Beitr. Ent.* 10: 1–131.
- Haworth, A.H. 1811–1829. *Lepidoptera Britannica* 3–4. London.
- Issiki, S. 1932. Plutellidae and Hyponomeutidae. In Esaki et al., *Iconographia Insectorum Japonicorum* ed. 2. Tokyo.
- Jeong, H.C., S.J. Kim and S.S. Kim. 1995. Moths collected at Mt. Mudeung, Kwangju-si in autumn. 1994. *J. Lepid. Soc. Korea* 8: 13–20.
- Liu, Y.Q. 1983. *Iconographia Heterocerorum Sinicorum*. 1: 1–134.
- Matsumura, S. 1931. *The 6000 Illustrated Insects of Japan*. Tokyo.
- Meyrick, E. 1895. *Handbook of the British Lepidoptera*, London.
- Meyrick, E. 1912–1937. *Exotic Microlepidoptera*, 1–5. Marlborough.
- Meyrick, E. 1914. Hyponomeutidae, Plutellidae and Amphitheridae. In Wagner, *Lepidopterorum Catalogus*, 19, Berlin.
- Moriuti, S. 1977. Fauna Japonica, Yponomeutidae (Insecta: Lepidoptera). Tokyo.
- Moriuti, S. 1982. Yponomeutoidea. In Inou et al., *Moths of Japan*, 1: 203–233, 2: 193–200, pls. 8–9.
- Park, K.T. 1983. Yponomeutidae. pp. 518–543. In Shin et al. (eds). *Illustration Flora & Fauna of Korea* 27(Insecta 9), 1053 pp. Ministry of Education.
- Park, K.T. 1994. [Microlepidoptera part] In Shin et Yoon, *Check List of Insects from Korea*, 313–341, The Entomological Society of Korea and Korean Society of Applied Entomology, Seoul.
- Stainton, H.T. 1854. *Insecta Britannica*. Lepidoptera: Tineina. London.
- Staudinger, O. and H. Rebel. 1901. Catalog der Lepidopteren des palaearctischen Faunengebietes, 1. Theil: i–[xxxii], 1–411; 2. Theil: 1–282; Index: 283–368. Berlin.
- Walker, F. 1863. *List of specimens of Lepidopterous Insects in the collection of the British Museum*. part, 28: 287–561. London.
- Walsingham, L. and J.H. Durrant. 1897. The Diamond-Back Moth: *Plutella cruciferarum*, Z. (1843), A synonym of *Cerastoma maculipennis*, Crt. (1832). *Ent. Month. Mag.* 33: 173–175.
- Zeller, P.C. 1844. Monographie des Genus *Yponomeuta*. Isis von Oken 1844: 198–238.

(Received: April 2, 2003, Accepted: June 10, 2003)